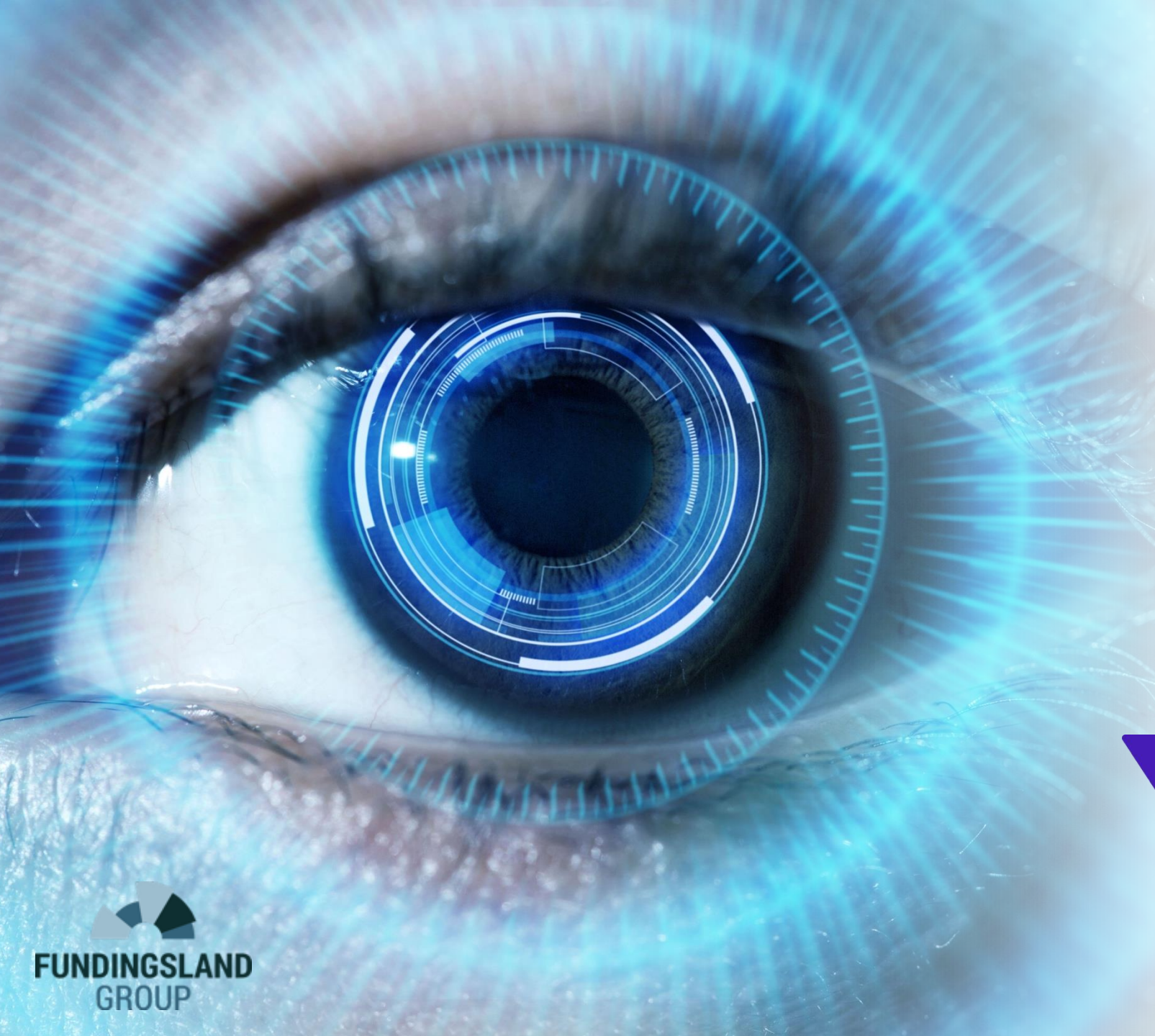

CASE-BASED CONVERSATIONS

on Neuromodulation, Inflammation, Eyelid Margin Disease, and ADC-Related Ocular Toxicity

FUNDINGSLAND GROUP

vision expo

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Grantor Statement

This activity is supported by unrestricted education grants from:

- AbbVie
- Harrow
- Sight Sciences
- Sun
- Tarsus

Learning Objectives

1. Identify and stage patients with eyelid margin disease (meibomian gland dysfunction [MGD] and *Demodex* Blepharitis [DB]), tear deficiency, and acute and chronic ocular Inflammation by incorporating consistent examination techniques to recognize the pathognomonic signs
2. Assess traditional and emerging diagnostic methods, including tear osmolarity, MMP-9, anterior segment OCT, meibography/gland expression, collarette detection, and incorporate validated symptom questionnaires and objective clinical data to improve the accuracy of OSD/DED diagnosis
3. Evaluate the various treatment options and apply evidence-based selection criteria to customize management strategies for the latest DB pharmaceuticals, neuromodulation therapies, anti-inflammatories (acute and chronic), mechanical and pharmacological MGD treatments
4. Recognize the ocular findings associated with antibody-drug conjugates (ADCs) for the treatment of certain cancers, perform the appropriate baseline and follow-up ophthalmic exams for patients receiving ADC therapy, and develop effective communication strategies with the patient's shared care team

Eyelid Margin Health: DB and MGD

Mile Brujic, OD, FAAO

Case Study

- 62-year-old man
- Patient has hypertension and type 2 diabetes which is controlled with medical therapy
- Patient feels like his eyes are bothering him more
- He is currently using lid scrubs bid and artificial tears prn
- Has a history of internal hordeolum OU
- Patient wears progressive addition glasses to correct for hyperopia and presbyopia

Case Study

At today's visit:

- Refraction
  - OD +1.00 20/20-1
  - OS +1.00 20/20-1
    - Add: +2.50 20/20 OU

Anterior segment

- Lids / lashes - +3 collarettes; moderate MGD
- Conjunctiva – mild hyperemia
- Tear Film - 5 to 10 seconds break up time OU
- Cornea – staining inferiorly OU
- Anterior chamber – clear and quiet OU
- Iris – healthy and flat OU
- Lens – Mild nuclear sclerosis

Demodex

- **56%** of patients with cataracts have DB[1]
- ***57%** of patients with MGD have DB[1]*
- **60%** of patients treated for dry eye also have DB[2]
- **66%** of blepharitis cases are associated with *Demodex* mites[1]
- **93%** of patients with soft contact lens intolerance were found to have DB[3]

Risk Factors:

- Rosacea, diabetes, increasing age, stress, smoking, immunosuppression, higher alcohol intake, and greater sun exposure[4-6]

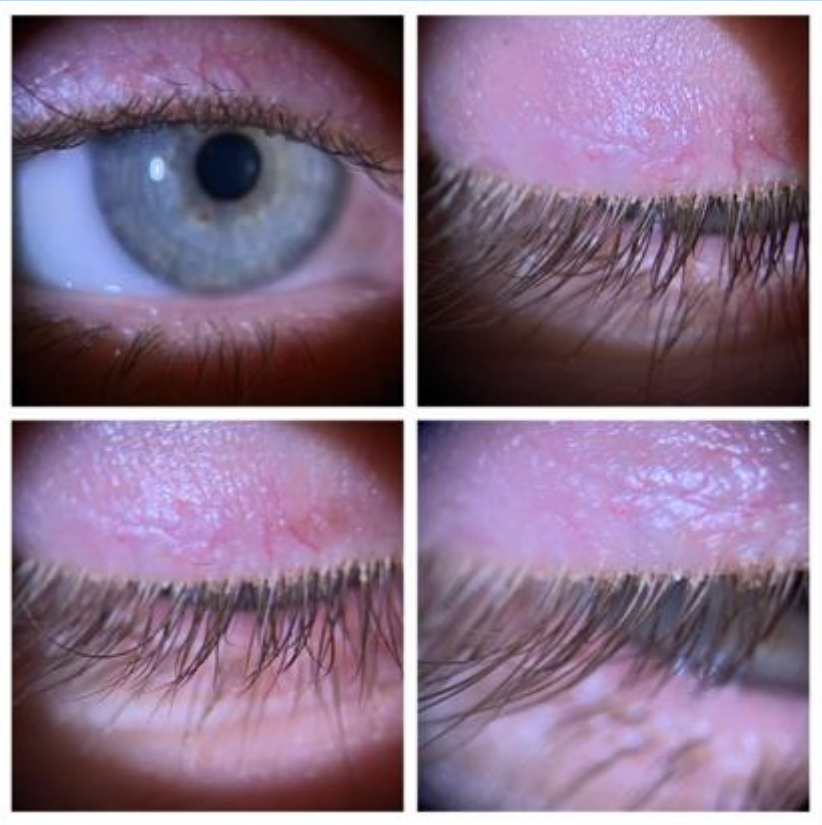
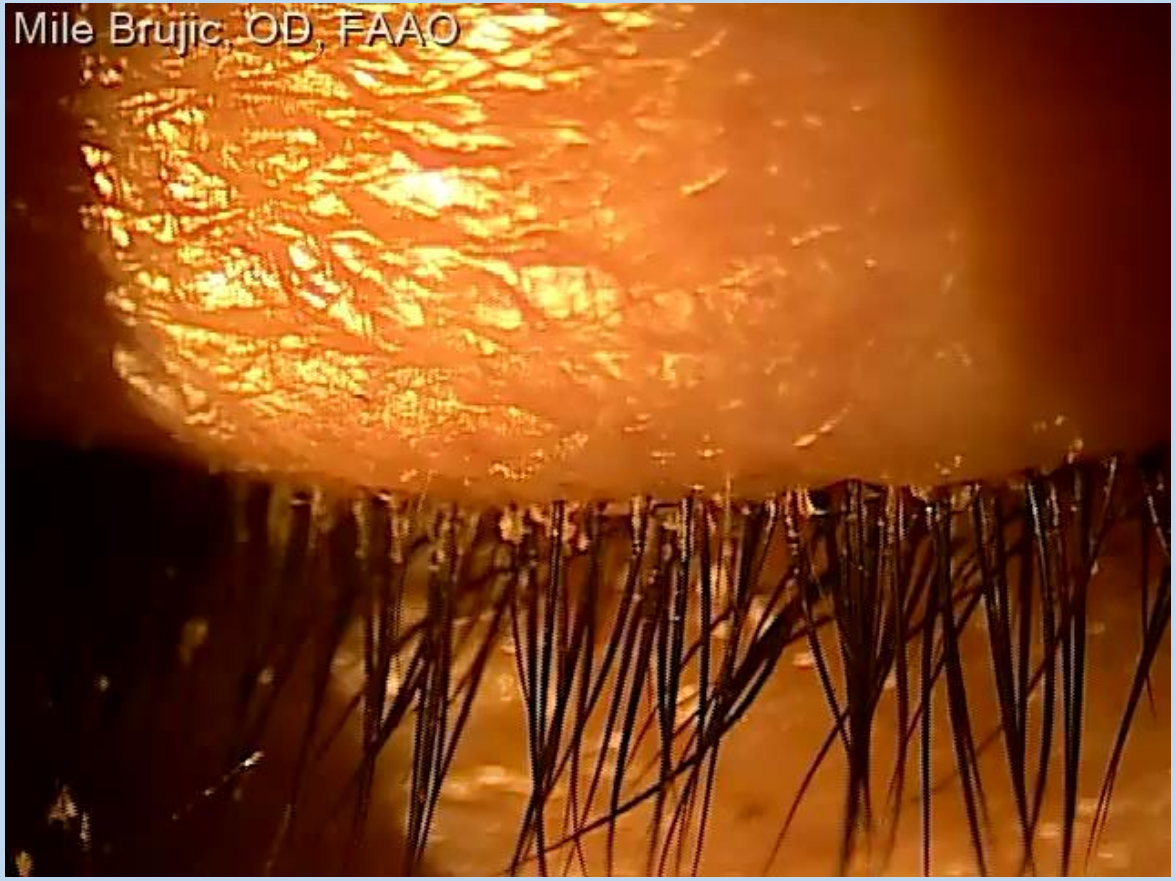
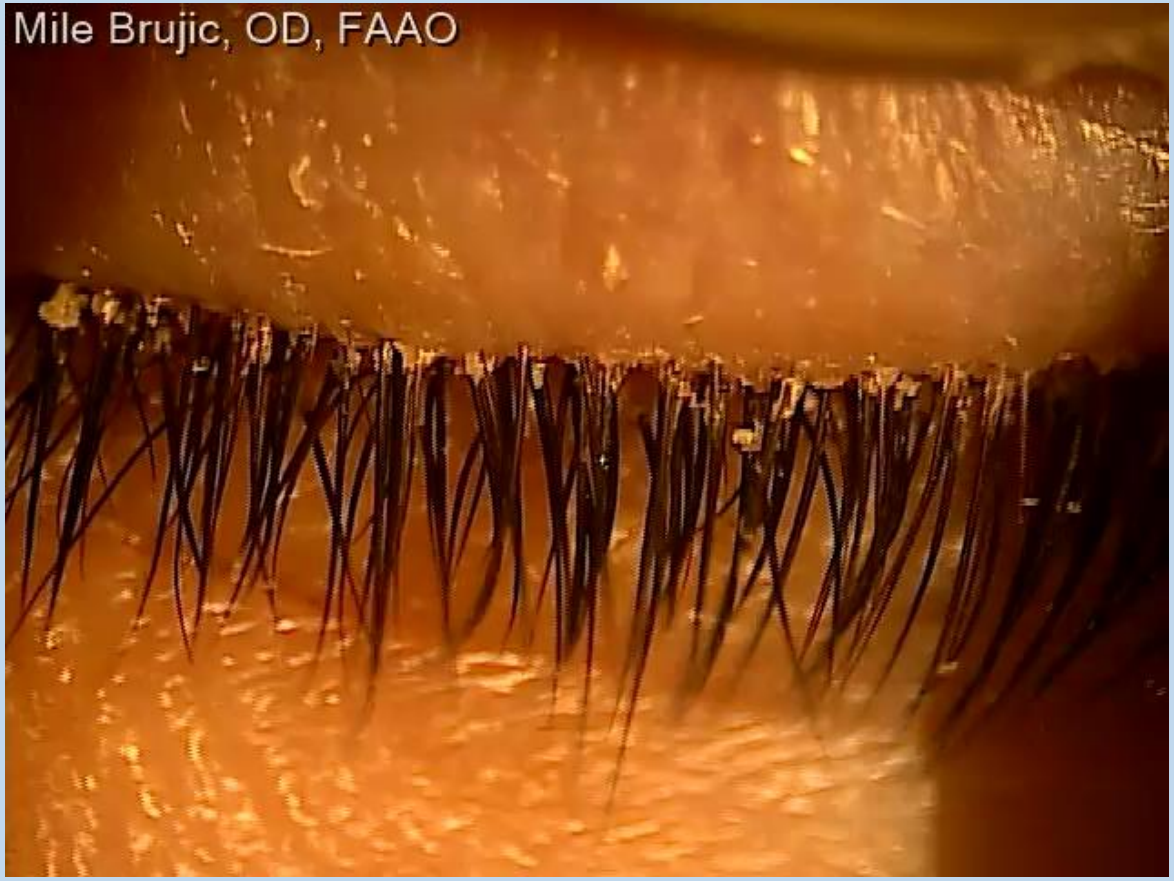


Image courtesy of Marc Bloomenstein, OD, FAAO

1. Trattler W et al. Clin Ophthalmol. 2022;16:1153-1164.
2. O'Dell L et al. Clin Ophthalmol. 2022;16:2979-2987.
3. Tarkowski W et al. Biomed Res Int. 2015;2015:259109.
4. Cheng AM, et al. *Cornea*. 2021;40(8):995-1001.
5. Nicholls SG, et al. *Int Ophthalmol*. 2017;37(1):303-312.
6. Luo X, et al. *Cornea*. 2017;36(suppl 1):S9-S14

Case Study





Demodex Blepharitis
Commonly Used Treatments

At-Home

- Tea tree oil
- Lid wipes
- Topical ivermectin cream
- Cleansers containing hypochlorous acid
- Lid scrubs
- Antibiotics

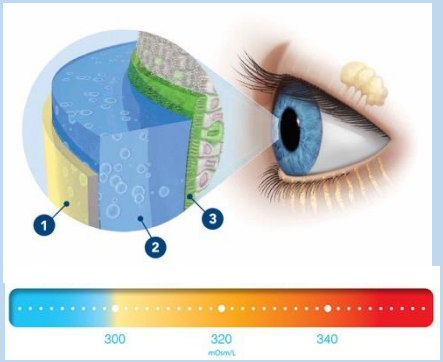
In-Office

- Intense pulsed light therapy
- Microblepharoexfoliation

Assessment of the Meibomian Glands

MGD/DED: Diagnostic Tools and Tests

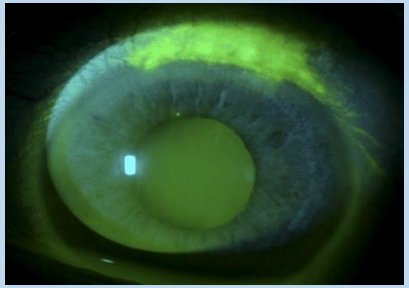
Tear Osmolarity



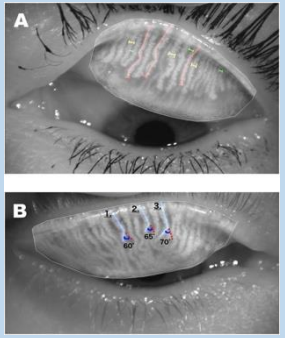
Slit-Lamp Exam

MMP-9

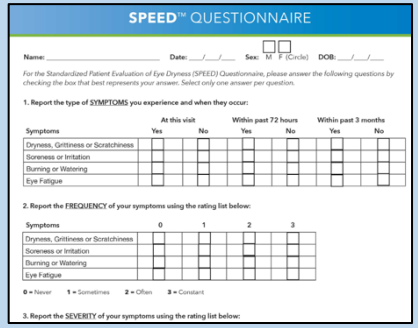
Vital Dyes



Meibography



DED Questionnaire



SPEED™ QUESTIONNAIRE

Name: _____ Date: ___/___/___ Sex: M F (Circle) DOB: ___/___/___

For the Standardized Patient Evaluation of Eye Dryness (SPEED) Questionnaire, please answer the following questions by checking the box that best represents your answer. Select only one answer per question.

1. Report the type of SYMPTOMS you experience and when they occur:

Symptoms	At this visit Yes	At this visit No	Within past 72 hours Yes	Within past 72 hours No	Within past 3 months Yes	Within past 3 months No
Dryness, Grittiness or Scratchiness						
Soreness or Irritation						
Burning or Watering						
Eye Fatigue						

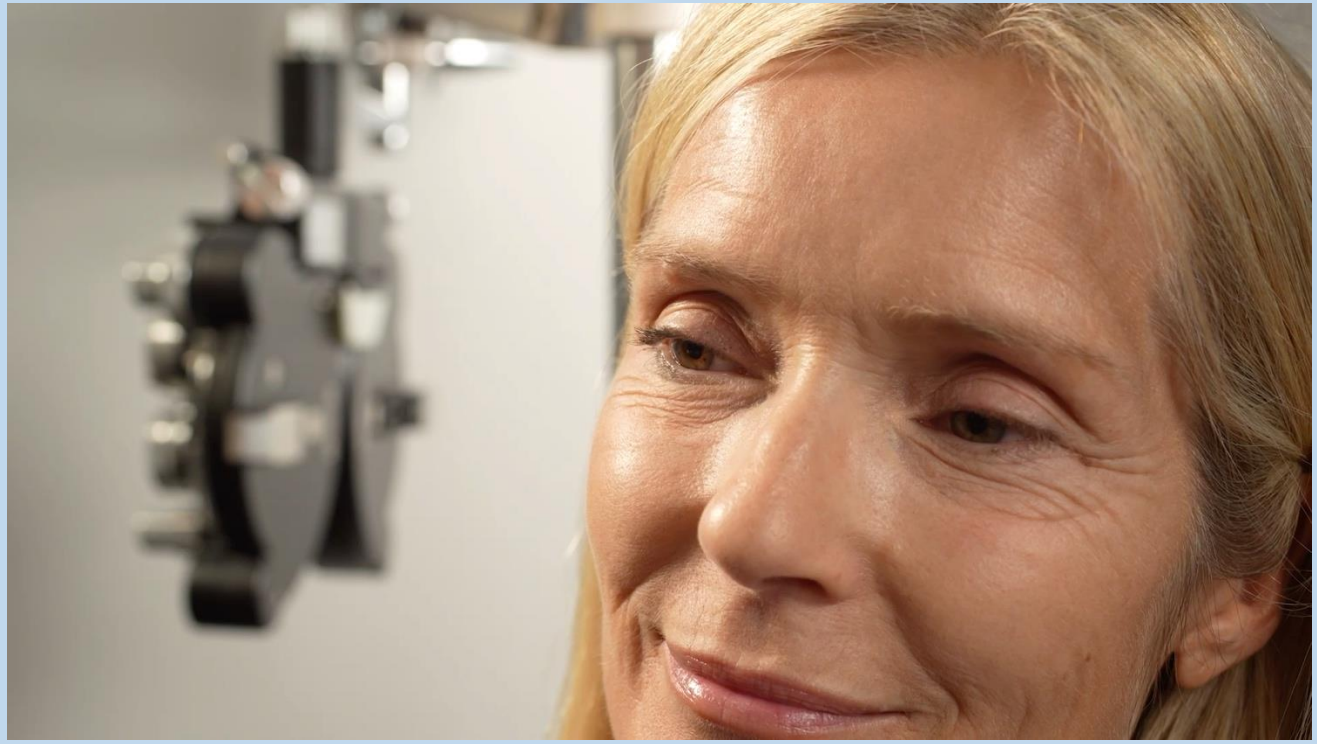
2. Report the FREQUENCY of your symptoms using the rating list below:

Symptoms	0	1	2	3
Dryness, Grittiness or Scratchiness				
Soreness or Irritation				
Burning or Watering				
Eye Fatigue				

0 = Never 1 = Sometimes 2 = Often 3 = Constant

3. Report the SEVERITY of your symptoms using the rating list below:

MGD: In-office Management



Video courtesy of Doug Devries, OD, and Marc Bloomenstein, OD, FAAO

- Systems that warm the lids so unhealthy oils can be expressed: TearCare (Sight Sciences) and LipiFlow (Johnson & Johnson)
- Stage 3 Sahara Randomized Control Trial: Hovanesian et al found that localized heat therapy with manual expression is an effective treatment for MGD, providing durable relief from DED signs and symptoms.
- Treatment twice per year can provide meaningful improvement and symptomatic relief for patients with moderate-to-severe DED

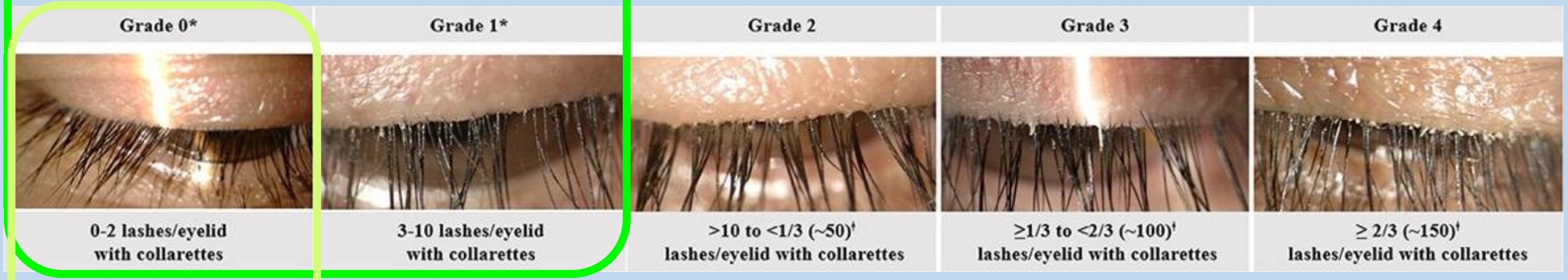
Hovanesian J, et al. Durability of the TearCare treatment effect in subjects with dry eye disease: Stage 3 of the Sahara randomized controlled trial. Optom Vis Sci. 2025;102(8):495-504.

Lotilaner

- Lipophilic agent in an aqueous drop that acts specifically via mite GABA-gated chloride channels to target, paralyze, and kill *Demodex* mites

SATURN-1 AND SATURN-2
Collarette Grading Scale

Clinically meaningful cure



Complete collarette cure

XDEMVY [prescribing information]. Tarsus Pharmaceuticals, Inc; 2023.
Toutain CE et al. *Parasit Vectors*. 2017;10(1):522.
Yeu E et al. *Cornea*. 2022;42:435-443.
Yeu E et al. Presented at: ARVO 2023; April 23-27, 2023; New Orleans, LA

Lotilaner | Key Study Data – ERSA and RHEA

ERSA and RHEA were two separate, randomized pilot studies evaluating the safety and efficacy of lotilaner ophthalmic solution 0.25% and vehicle for the **treatment of DB with MGD**. Eligibility criteria and endpoints for the ERSA and RHEA studies were identical.

ERSA: Collarette grade reduction and responder rate at day 43

Reduction to ≤2 collarettes

of patients treated with lotilaner 0.25% (n=20)

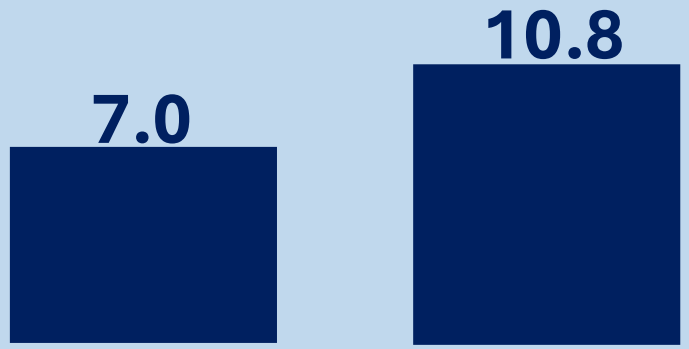
Reduction to ≤10 collarettes

of patients treated with lotilaner 0.25% (n=20)

RHEA: At Day 43, vehicle (n=10) did not show statistically significant improvement in mean collarette grade compared with baseline (*P*>.1)

ERSA: Patients treated saw ~54% improvement in mean meibomian glands yielding liquid secretion (MGYLS) at day 43 compared with baseline

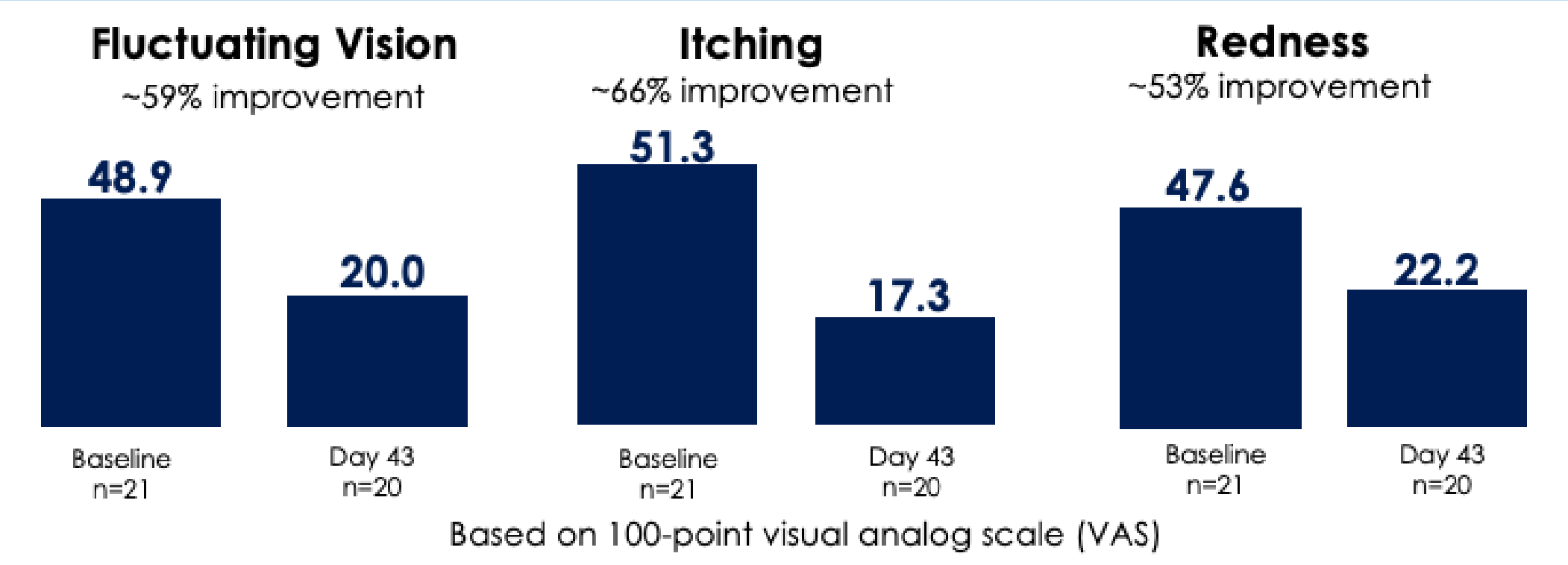
Number of expressible glands



RHEA: At Day 43, vehicle (n=10) did not show statistically significant improvement in number of MGYLS compared with baseline (*P*>.1)

Shultz M. Lotilaner Boosts Meibomian Gland Function. Presented at: ASCRS 2025; April 25-28, 2025. Los Angeles.

Key Study Data – Patient Reported Outcomes



RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported fluctuating vision compared with baseline (*P*>.1)

RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported itching compared with baseline (*P*>.1)

RHEA: At day 43, vehicle (n=10) did not show statistically significant improvement in patient-reported redness compared with baseline (*P*>.1)

Shultz M. Lotilaner Boosts Meibomian Gland Function. Presented at: ASCRS 2025; April 25-28, 2025. Los Angeles.

Case Study

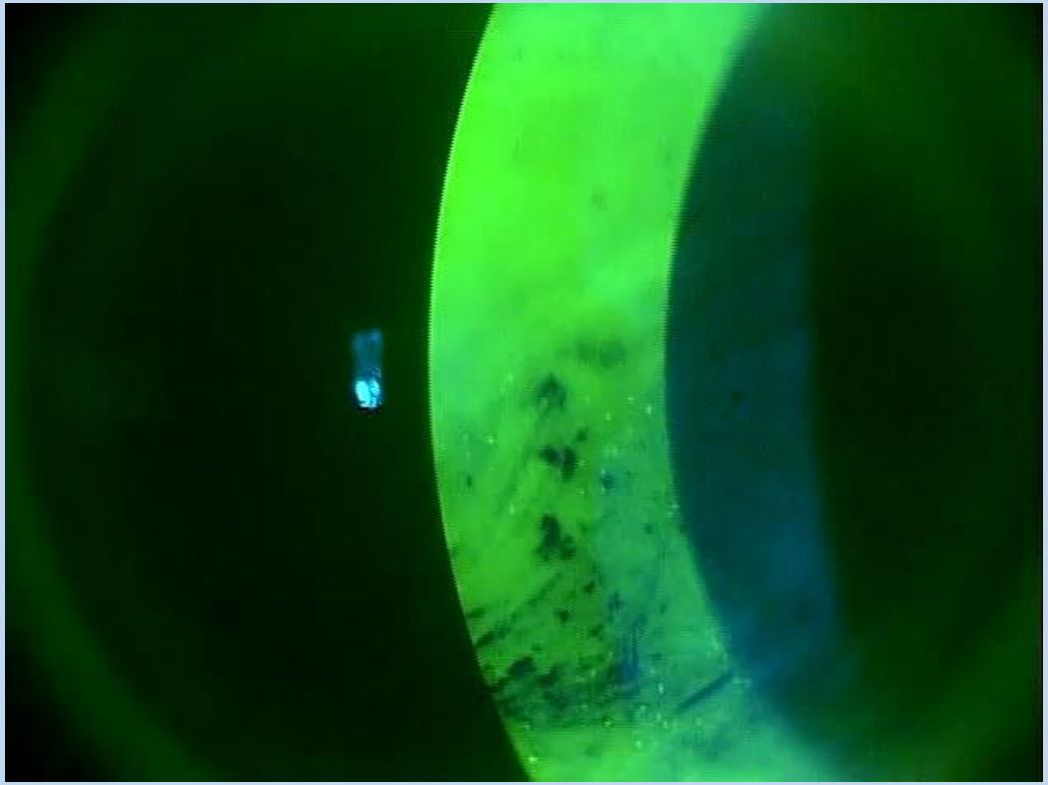
- Patient educated about findings
- Prescribed lotilaner 0.25% 1 gtt bid OU for 42 days
- Patient to return in 2 months for follow up

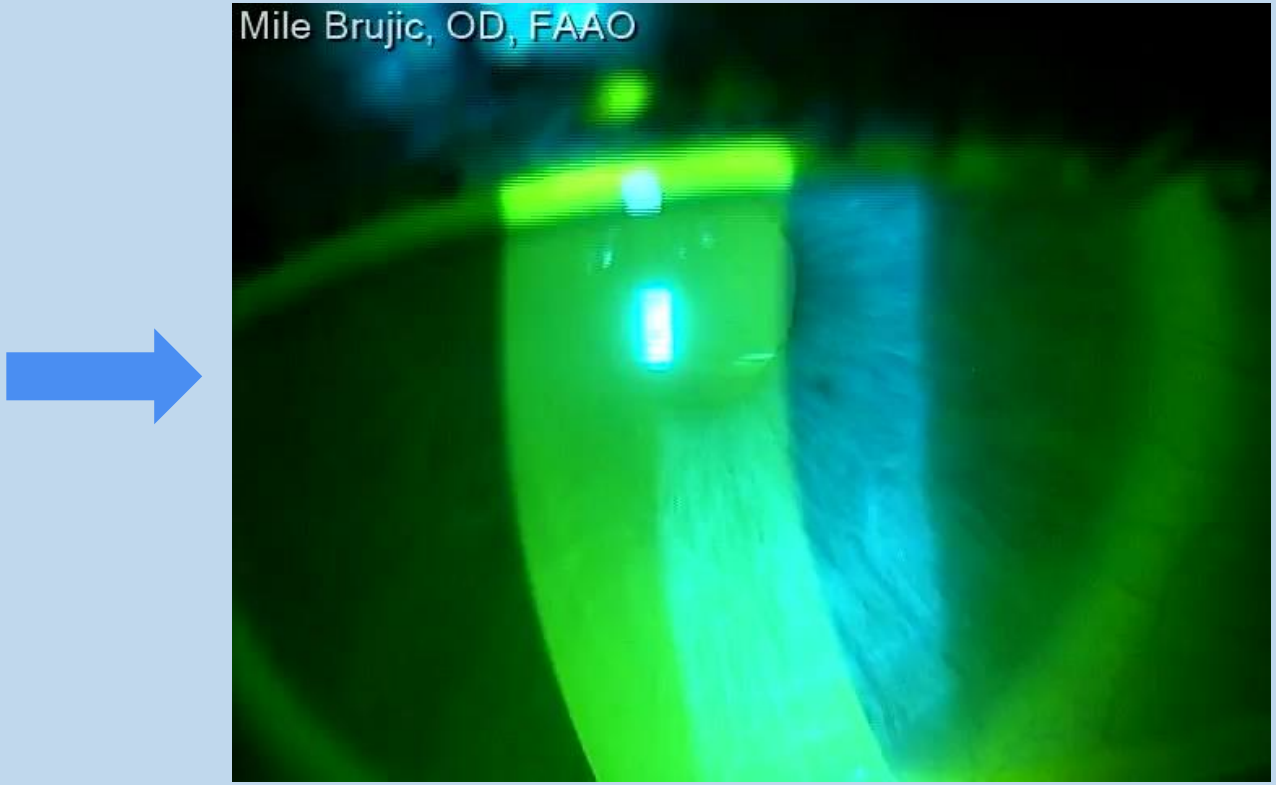
Case Study

- 2 month follow-up
- Patient reports vision seems better than at last visit
- Not using any lid scrubs and patient feels like eyes are much more comfortable; hasn't felt the need to use artificial tears for 2 weeks
- Anterior segment
  - Lids / lashes – trace collarettes
  - Conjunctiva – mild hyperemia
  - Tear Film - 7 seconds break up time OU
  - Cornea – clear OU
  - Anterior chamber – clear and quiet OU
  - Iris – healthy and flat OU
  - Lens – Mild nuclear sclerosis

Case Study

Pre versus post tear film break up time





OSD, DED & Inflammation

Cecelia Koetting, OD, FAAO, DipABO

Case Study 1

- 71-year-old man presents for cataract evaluation
- NO symptoms, says he's fine other than his decreased vision and headlights at night.
  - .....Oh and vision gets better when he blinks
- Tear Osmolarity:
  - OD 320
  - OS 290
- MMP 9
  - OD strong positive
  - OS strong positive

- Lids and Lashes
  - OD: Capped glands, M3 Moderate to compression, 1+ bleph, 2+ collarettes, biofilm
  - OS: Capped glands M3, moderate to compression, 1+ bleph, 2+ collarettes, biofilm
- Conjunctiva
  - 1+ LS inferior, 1+ CCH OU, good tear meniscus height
- Cornea
  - **1+ scattered SPK, 5 second TBUT,** OU
- Lens
  - Nuclear sclerosis 2+ OU

Case Study 1
Ok, so what's the issue?

- Poor quality meibum
  - Biofilm, keratinization
  - *Demodex* overgrowth
  - Bacteria overgrowth
- Quickened Evaporation rate
- Poor tear osmolarity
- Confirmed inflammation

- Meibomian Gland Dysfunction→ severe
- *Demodex* Blepharitis
- Dry Eye Syndrome with inflammation

What would you do?

Key Updates & Take Aways: TFOS DEWS III

- There is not always an inflammatory component
- Updated Screening Questionnaire
  - OSDI-6
  - Normal (0-3 points); mild-to moderate DED (4-8 points); or severe DED (9-24 points)
- Symptoms positive + 1 of the following tests = diagnosis of DED
- Treatment algorithms broken into underlying issues

Symptoms +1 of the following:

Tear Film Markers

Noninvasive TBUT: <10s [fluorescein TBUT >5s]

OR

Osmolarity (≥ mOsm/L in higher eye or interocular difference >8 mOmsm/L)

Ocular Surface Staining

-Cornea: >punctate spots

and/or

-Conjunctiva: >9 punctate spots

and/or

-Lid margin: ≥ 2 mm length and ≥ 25% width

Tear Film Deficiencies

Lipid Layer
Muco-Aqueous Phase
Glycocalyx
Cornea

Etiologic Drive Tests
Lipid
Tear film lipid layer thickness/interferometry
Meibomian gland expressibility
Meibum quality
Aqueous
Tear meniscus height
Meniscometry/Schirmer / phenol red thread test
Mucin / glycocalyx
Lissamine green / rose Bengal staining
Conjunctival impression cytology

Evidence-Based Interventions
Lipid
Tear supplementation / stabilization (lipomimetics)
Tar conservation devices (moisture-retaining spectacles)
Pharmacological tear stimulation / restoration
Device tear stimulation / restoration
Blink therapies
Topical lid hygiene
Aqueous
Oral nutrition (Omega-3)
Tear supplementation / stabilization
Tear conservation devices
Pharmacological tear stimulation / Device tear stimulation / restoration
Topical anti-inflammatories
Ocular surface regenerators / Surgical options
Mucin / glycocalyx
Tear supplementation / stabilization (HP guar)
Topical anti-inflammatories
Device tear stimulation

https://contactlensupdate.com/2025/12/12/dews-iii-downloadable-summaries/
Wolffsohn JS, et al. TFOS DEWS III: Diagnostic Methodology. Am J Ophthalmol. 2025;279:387-450.

What's My Plan?

Evaluation April 14th

- Discussed daily eyelid maintenance
  - Heat Mask
  - Omega 3 FA
  - Lid hygiene
    - *Demodex* control with Okra based or TTO-based cleanser
- Inflammation control
  - Loteprednol BID for 2 weeks
  - Lifitegrast BID
- Lotilaner ophthalmic solution BID until gone

May 1st

- Thermoexpression and blepharoexfoliation combined treatment

June 1st follow up, improved

- Re-measurements

Case Study 2

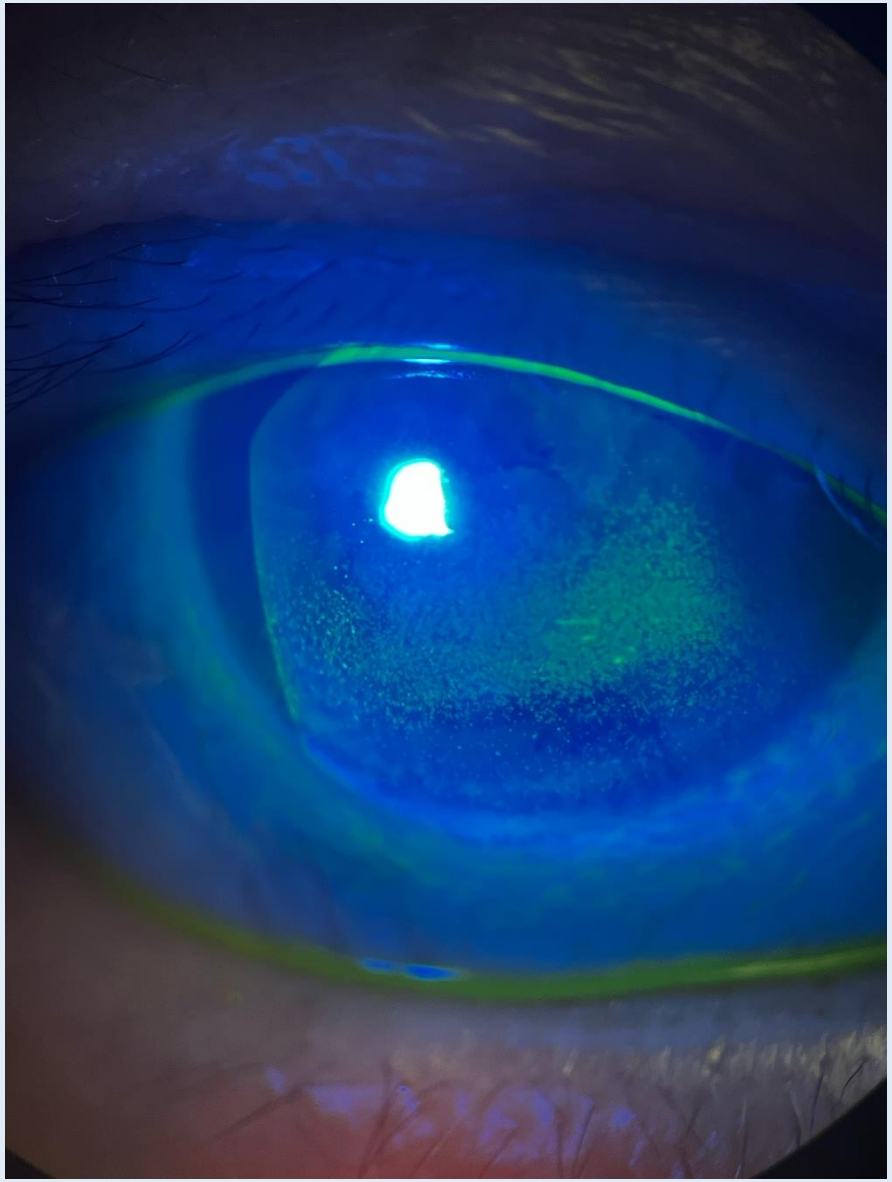
- 50-year-old woman presents for 2nd opinion to dry eye clinic
- Irritated, gritty, worse at end of day; Light sensitive
- SPEED: 15/28
- Tear Osmolarity:
  - OD 291
  - OS 289
- MMP 9
  - OD light positive
  - OS light positive
- Lids and Lashes
  - OU: tr MGD easy expression, minimal turbidity, no collarettes, no blepharitis
- Conjunctiva
  - 2+ LS inferior, tr+ CCH OU, low tear meniscus height
- Cornea
  - 2-3+ central and inf SPK; 6 second TBUT, OU
- Lens
  - Nuclear sclerosis tr+ OU

Case 2
Ok, so what's the issue?

- Minimal MGD
- Low tear volume
- Confirmed inflammation

- Meibomian Gland Dysfunction → mild
- Dry Eye Syndrome with inflammation
- Specifically Aqueous Deficiency

What would you do?



Pharmaceutical Options 2003 - 2025

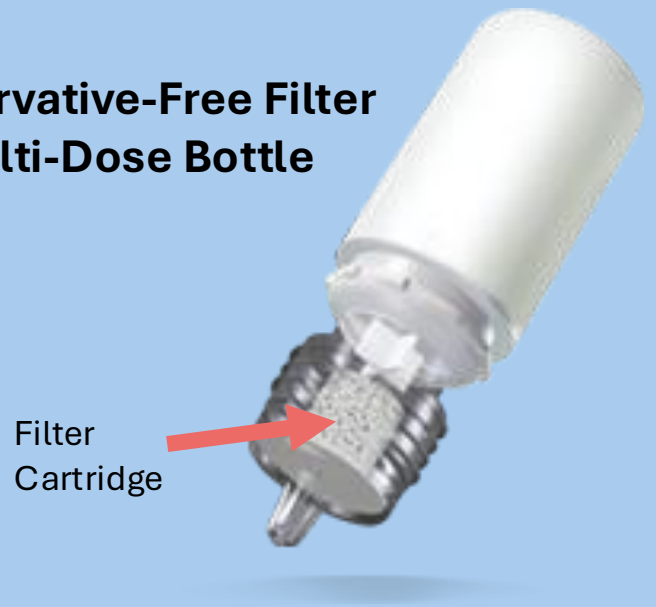
- Cyclosporine 0.05%
- Lifitegrast 5%
- Cyclosporine 0.09%
- Cenegermin-bkbj
- Loteprednol 0.25%
- Varenicline 0.03 mg
- Lotilaner 0.25%
- Perfluorohexyloctane 100%
- Cyclosporine 0.1% in perfluorobuylpentane
- Acoltremon 0.003%

Preservatives in Ophthalmic Medication

- Most artificial tears that come in a multi-dose bottle contain preservatives designed to decrease the growth of bacteria once the bottle has been opened
- **Benzalkonium chloride (BAK)** is the most common preservative
  - May be harmful to the ocular surface
  - Decreases goblet cell density
  - Delays wound healing
  - Damages corneal nerves
  - Disrupts corneal and conjunctival cells

• Alternative preservatives to BAK include: Polyquaternium-1 (PQ, Polyquad), Oxidizing preservatives (SOC, Sodium perborate), Ionic buffered preservative (SofZia), and Sodium perborate (GenAqua and Dequest; SPB)

Preservative-Free Filter Multi-Dose Bottle



- Newly developed multi-dose bottles deliver drops through a filter which prevents microbial contamination and removes the preservative
- Contents can now be used for up to 3 months after opening

Walsh K, Jones L. The use of preservatives in dry eye drops. Clin Ophthalmol. 2019 1;13:1409-1425.

Cyclosporine Ophthalmic Solution 0.1%

- A preservative-free solution that enhances the penetration of cyclosporine into the cornea, directly targeting inflammation
  - High-concentration cyclosporine serves as both an **anti-inflammatory and immunomodulator**
  - Unique semifluorinated alkane (SFA) vehicle spreads evenly across ocular surface and integrates into tear lipid layer
- Detectable in tears for up to 8 hours

PFBP Vehicle Impact on Cyclosporine Treatment

- Perfluorobutylpentane (PFBP) improves lipid layer grading, which may play a role in reducing tear evaporation

  -TFOS DEWS III Management and Therapy Report
- PFBP improves tear fluid lipid layer thickness within minutes after instillation and may reduce tear evaporation in DED patients with a compromised tear fluid lipid layer

Akpek EK, et al. JAMA Ophthalmol. 2023;141(5):459-466.
Agarwal P, et al.. Expert Opinion on Drug Delivery. 2025:1-16.
Jones L, et al. American Journal of Ophthalmology. 2025;279:289-386.

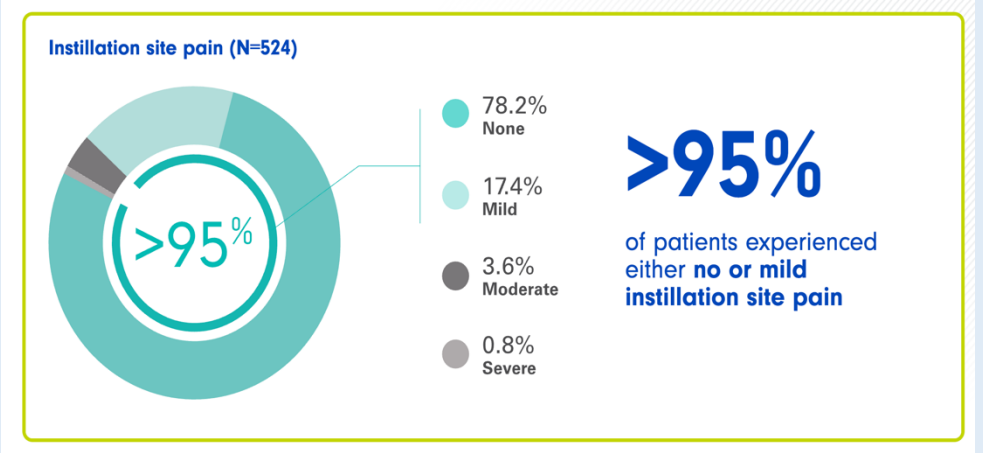
Cyclosporine 0.1% | ESSENCE-2 Open-Label Extension (OLE)

- At week 52 of ESSENCE-2, 175 patients (86.6%) completed ESSENCE-2 OLE
- 55 patients (27.5%) reported 74 ocular treatment-emergent adverse events
  - mild instillation site pain (6.5%) most common
- Patients showed statistically significant improvements in all prespecified efficacy end points compared with baseline
- Corneal staining improvements occurred early and stabilized over time; tear production improved continuously
- Symptomatology improvement followed these effects with scores reaching a minimum after 1 year of treatment
- Sustained 1-year efficacy in both signs and symptoms of DED
- May help understand short and long-term healing dynamics in patients with predominantly inflammatory DED

Wirta DL, et al. Long-Term Safety and Efficacy of a Water-Free Cyclosporine0.1% Ophthalmic Solution for Treatment of Dry Eye Disease: ESSENCE-2 OLE. 2024;44(6):692-700.

Cyclosporine Ophthalmic Solution 0.09%

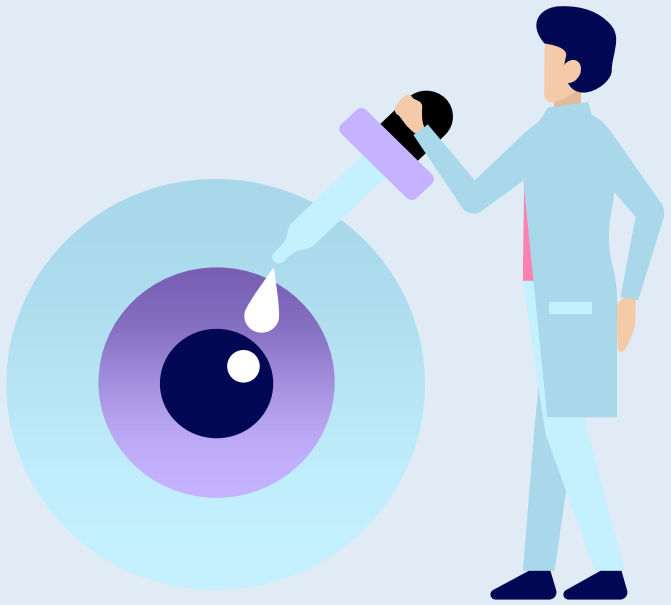
- A calcineurin inhibitor immunosuppressant indicated to increase tear production in patients with DED
- Nanomicellar formulation (NCELL) encapsulates hydrophobic cyclosporine molecules for improved solubility and penetration through the tear film into ocular tissues
- Addresses cause of tear deficiency, not just symptoms
- Supports corneal and conjunctival epithelial integrity
- May improve visual quality in symptomatic dry eye patients
- Most clinical trials patients found cyclosporine 0.09% to be comfortable right from the start
    - 9 of 10 patients reported no or mild discomfort after 3 minutes



US Patent 9,937,225 B2.
Data on file. Cranbury, NJ: Sun Pharmaceutical Industries, Inc.
Cholkar K, et al. Transl Vis Sci Technol. 2015;4(3):1-16.
Mandal A, et al. J Control Release. 2017;248:96-116.
Tauber J, et al.*Clin Ophthalmol*. 2018;12:1921-1929.

Cyclosporine Ophthalmic Solution 0.09%
Reduction in instillation site discomfort

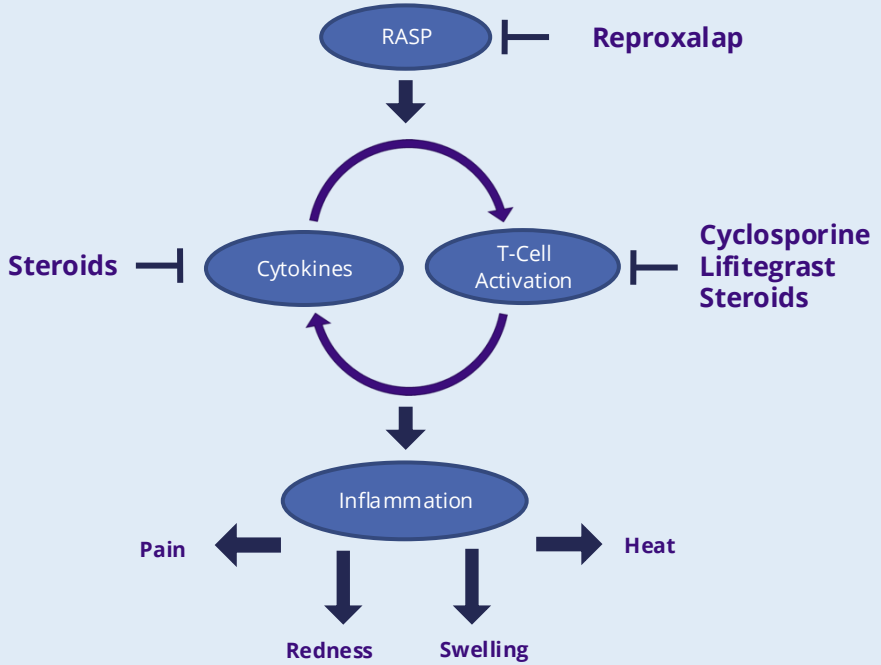
- 2025 report found that up to 60% of participants (n = 24) had less discomfort with cold instillation of 0.09% cyclosporine compared with than warm instillation
- Effect lasted up to 9 minutes postinstillation
- Remaining participants experienced minimal difference (n = 10) or increased cumulative discomfort (n = 6)



Ngo W, Nagaarudkumaran N, Huynh CB. Refrigeration reduces instillation discomfort of a 0.09% cyclosporine A solution. Optom Vis Sci. 2025;102(1):14-19.

Pipeline:
Reactive Aldhyde Species (RASP) Inhibitor

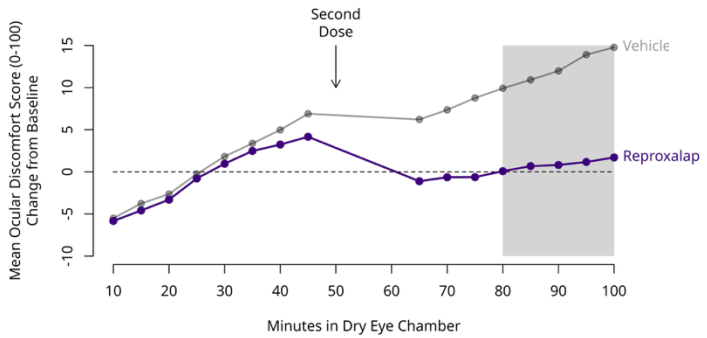
- Reactive aldehyde species (RASP) are elevated in the tears and conjunctiva of patients with DED
- RASP levels correlate with the severity of symptoms and signs
- Reproxalap works at the top of the inflammatory cascade
- RASP represent a novel target for the treatment of DED and other forms of ocular inflammation, including noninfectious anterior uveitis and allergic conjunctivitis



Garg S, Donnenfeld E, Sheppard J, Epitropoulos A, Brady TC. Reproxalap Improves Ocular Redness, Tear Production, and Symptoms in a Pivotal Dry Eye Disease Chamber Trial. Ophthalmology Science 2026;6:100938. Am J Ophthalmol. 2014;157(4):799-806. Topical ocular reproxalap is an investigational new drug candidate that has been studied in more than 2,500 patients with no observed safety concerns;mild and transient instillation site irritation is the most commonly reported adverse event in clinical trials.

RASP Inhibitor DED Pivotal Trials

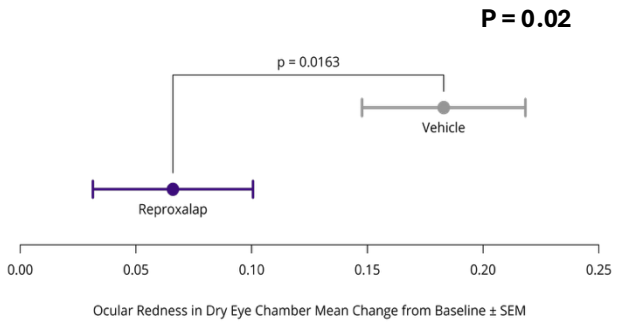
Ocular Discomfort Symptom Score



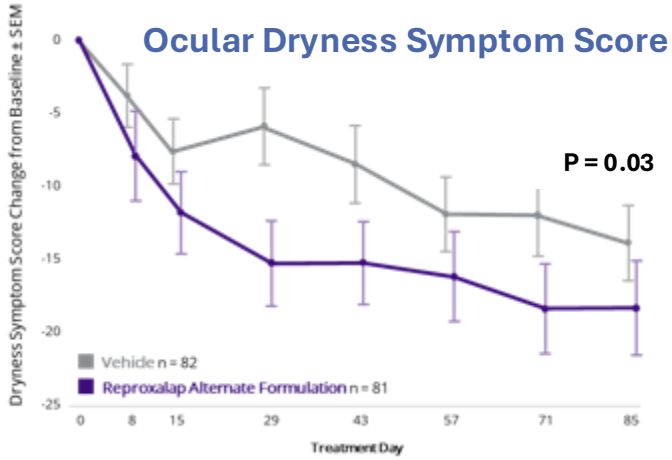
P = 0.002

Ocular Redness

P = 0.02

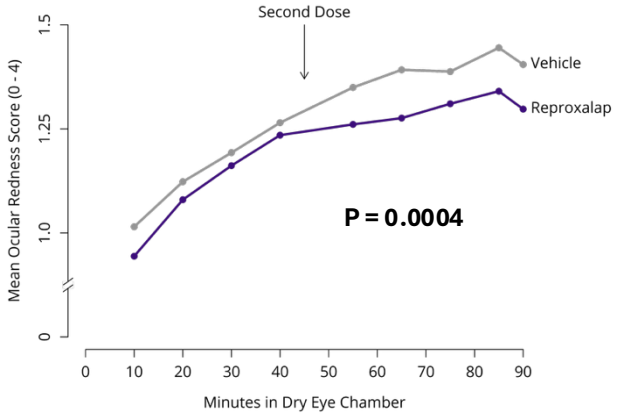


Ocular Dryness Symptom Score



P = 0.03

Ocular Redness



P = 0.0004

Am J Ophthalmol. 2014;157(4):799-806. Topical ocular reproxalap is an investigational new drug candidate that has been studied in more than 2,500 patients with no observed safety concerns; mild and transient instillation site irritation is the most commonly reported adverse event in clinical trials.

Pipeline: RASP Inhibitor

- Results of vehicle-controlled, randomized-sequence, double-masked, 2-period crossover trial to assess the acute efficacy of 0.25% reproxalap ophthalmic solution versus vehicle in patients with DED showed reproxalap increased tear production and decreased redness within minutes in a dry eye chamber
- 63 patients with DED (ages 18 to 70 years) were treated with reproxalap or vehicle in 2 treatment periods

- *Dry eye chambers expose subjects to rigorously controlled levels of low humidity air and have been used to simulate flares by exacerbating the signs and symptoms of ocular dryness. Dry eye chambers are specified in the draft US Food and Drug Administration guidance for the development of drugs in DED*

FDA extended PDUFA target action date for reproxalap to March 16, 2026.

Garg S, Donnenfeld E, Sheppard J, Epitropoulos A, Brady TC. Reproxalap Improves Ocular Redness, Tear Production, and Symptoms in a Pivotal Dry Eye Disease Chamber Trial. Ophthalmology Science 2026;6:100938

What About Neuromodulators?

- Target the lacrimal functional unit to improve basal tears and reduce symptoms
- Available options:
    - varenicline (intranasal, nasal spray)
    - acoltremon (eye drop)

- TFOS DEWS III highlighted that not all DED is inflammatory
- 2026 Delphi Panel published in *Ocular Surface*
    - Consensus on the importance of restoring natural tear production as a primary goal in treating DED
    - Neuromodulation represents a promising treatment option for DED, offering a rapid and restorative therapeutic approach for natural tear production

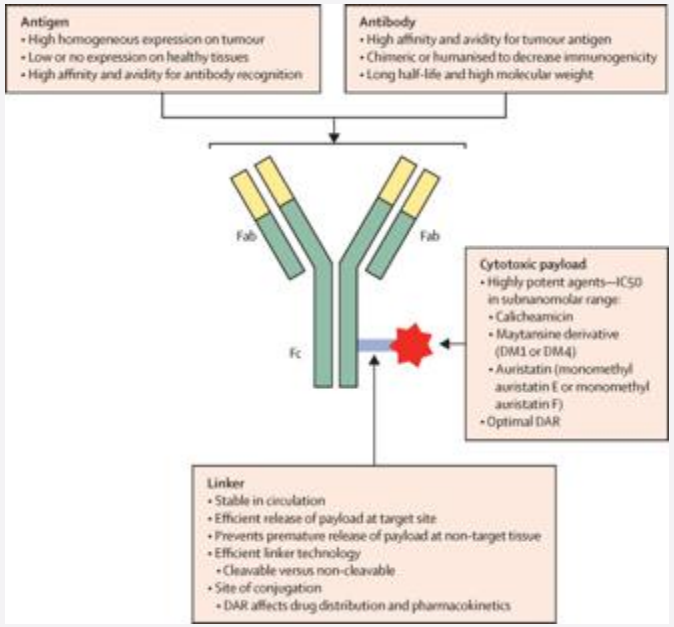
Wolffsohn JS, et al. TFOS DEWS III: Diagnostic Methodology. Am J Ophthalmol. 2025;279:387-450
Akpel E, Jones L, Nichols KK, Nijm LM, Pflugfelder S, et al. Delphi panel on neuromodulation as a treatment strategy for dry eye disease: Unlocking the potential of natural tear production. Ocular Surf. 2026;38:34-40.

Oncology Treatments & Ocular Toxicity

Jacob Lang, OD, FAAO

Antibody-Drug Conjugates (ADCs)

- Also known as **immunoconjugates**
- Represent a **newer class** of chemotherapy drugs
- Comprised of **monoclonal antibodies** (mAB) tethered to a **cytotoxic drug** (known as the “payload” or “warhead”) via a **chemical linker**



Chau CH, et al. Lancet. 2019;31;394(10200):793-804.

Used to Treat:

- Ovarian
- Cervical
- B-cell lymphoma
- Multiple myeloma
- Breast
- Others

ADCs with Ocular Risks*

Mirvetuximab Soravtansine (MIRV)	Tisotumab Vedotin (TV)	Belantamab mafodotin
• Ocular adverse reactions occurred in 61% of treated patients treated • 9% experienced grade 3 ocular AEs • Most common: visual impairment (49%); keratopathy (36%)	• 53% of ADC patients experienced ocular adverse events • 26% conjunctivitis • 23% dry eye • 11% keratitis	• Ocular toxicity occurred in 92% of treated patients • 77% of patients had Grade 3 or 4 • 83% required dosage modification due to ocular toxicity

Lang S, et al. Gynecologic Oncology. 2024;190, Supplement 1:S449 -S450.
Coleman RL, et al. Lancet Oncol. 2021;22(5):609-619.
Wahab A, et al. Front Oncol. 2021;11:678634.

not a comprehensive list of FDA approved ADCs; these are three of the newest ADCs

Case Study

December 2025

- 71-year-old woman reports for CE, Dec 2025
- Starting chemotherapy soon for ovarian cancer and was told to get a baseline exam
- History of dry eye with punctal plugs in past; pseudophakic OU

January 2026

- Normal exam after mirvetuximab soravtansine-gynx treatment
- Normal Exam

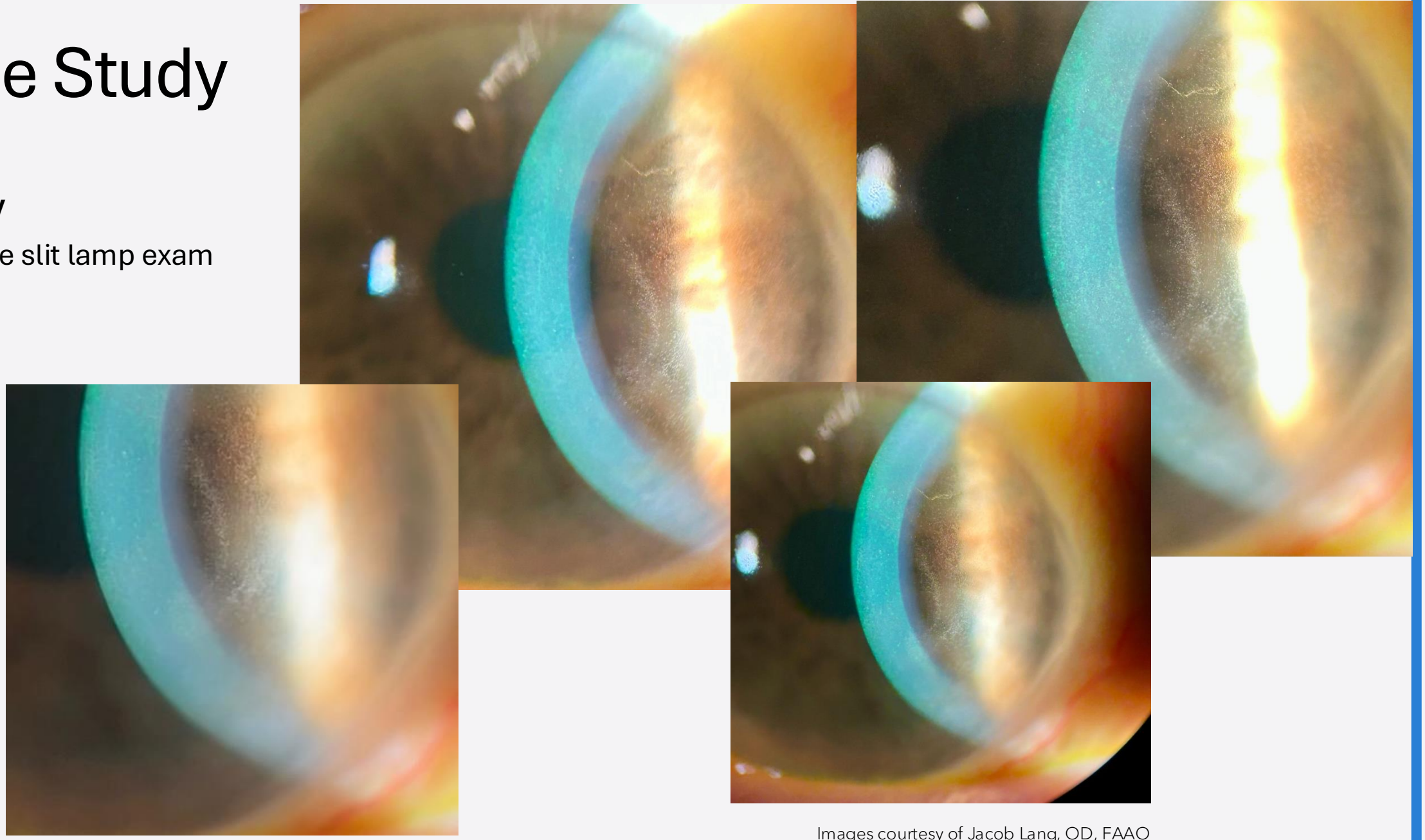
February 2026

- Increasing Halos around lights; Patient reports “tumors are half the size!”
- Slit Lamp Exam

Case Study

February

- Left eye slit lamp exam

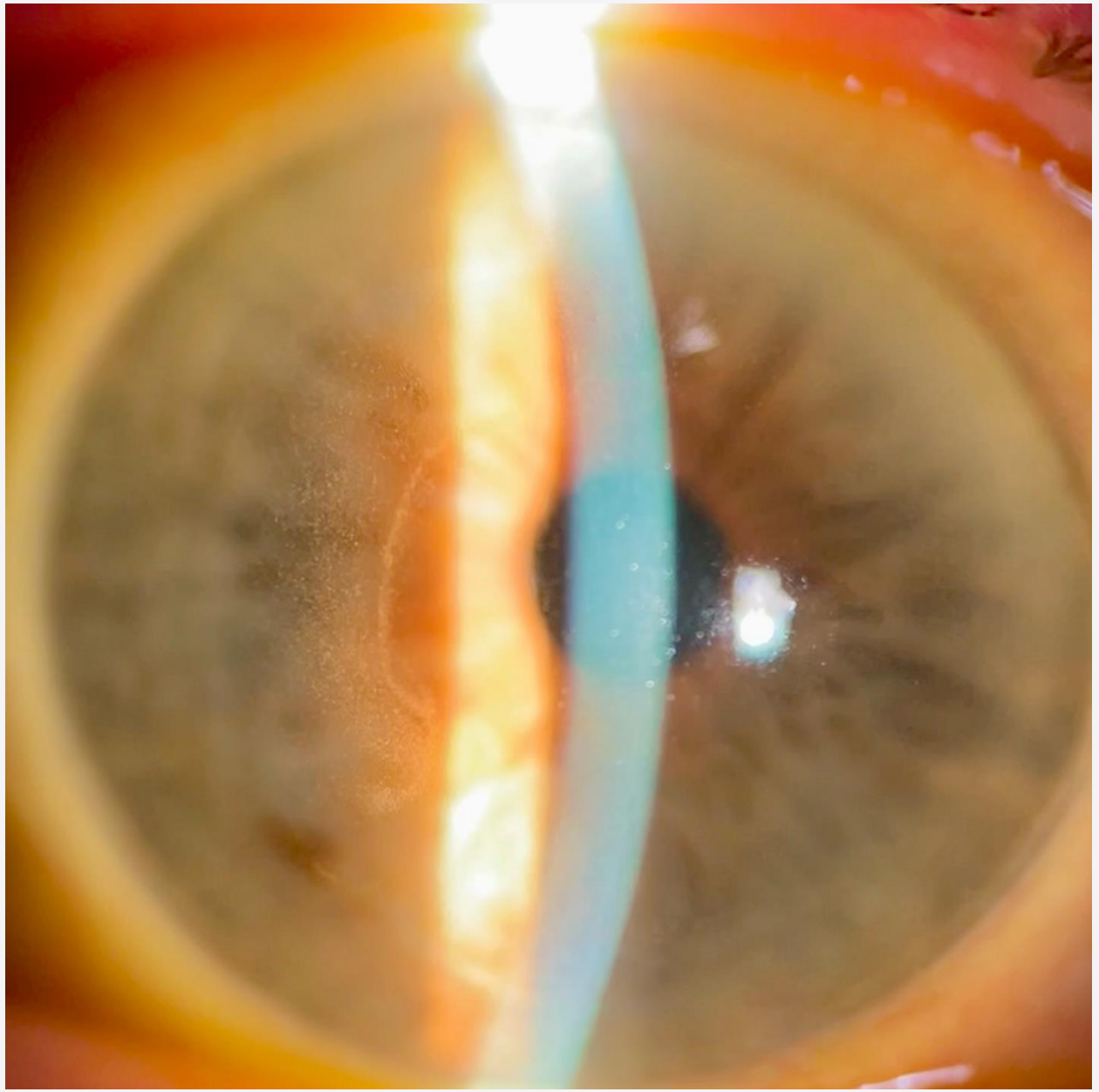


Images courtesy of Jacob Lang, OD, FAAO

Case Study

February

- Right (other) eye slit lamp exam



Images courtesy of Jacob Lang, OD, FAAO

ADCs and Ocular AEs

Patient Impact:

- 56% of patients treated with mirvetuximab soravtansine
- 50% to 60% of patients treated with tisotumab vedotin

Adverse events mainly impact the anterior ocular segment

- Most common:
  - conjunctivitis
  - keratopathy

PROLONGED VIGILANCE NEEDED

Median time to onset is 1.3 months

Ocular toxicity may appear up to 10 months after treatment initiation

Zina BB, et al. Practical clinical management of ocular adverse events related to antibody-drug conjugates in gynaecological malignancies. Cancer Treatment Reviews. 2025; 134:102867.

Proposed Off-Target Mechanism of ADC-Associated Pseudomicrocysts

- The ADC enters the cornea, and is internalized by limbal epithelial stem cells
- Process of internalization: macropinocytosis, a nonspecific form of cellular uptake
- Refractive shifts can occur as well as changes in BCVA
- **Peripheral** pseudomicrocysts associated with **hyperopic** shifts
- **Paracentral/central** pseudomicrocysts associated with **myopic** shifts

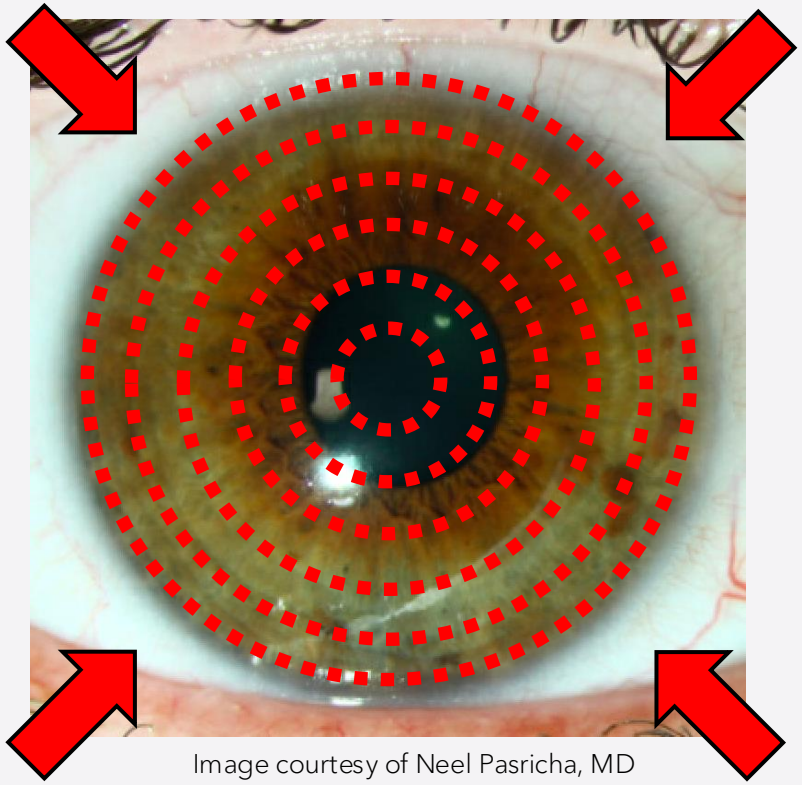


Image courtesy of Neel Pasricha, MD

Canestraro J, et al. Refractive Shifts and Changes in Corneal Curvature Associated with Antibody-Drug Conjugate. Cornea. 2022;41(6):792-801.
Aramberri J, Savini G, Hoffer KJ. IOL Power Calculation After Corneal Refractive Surgery. In: Aramberri J. Hoffer KJ, Olsen T, Savini G, Shammas HJ. (eds) Intraocular Lens Calculations. Essentials in Ophthalmology. 2024. Springer, Cham.

American Academy of Ophthalmology | July 2025
ADCs and Ocular Toxicities: Call for Standardized Guidelines

Eye Examinations for Patients on ADCs

1. Provide a baseline examination prior to the start of the ADCs to allow for assessment for change while on the therapy.
2. Provide counseling on the use of preservative-free artificial tears and sometimes topical corticosteroids during treatment cycles. Additionally, ocular surface vasoconstrictors may be recommended during the infusions (such as with topical brimonidine 0.2% and cold compress eye masks).
3. Provide education for patients on the symptoms of AEs and contact information to schedule a repeat examination if symptoms occur.
4. Provide follow-up visits to identify AEs early and tailor treatment and follow-up based on the grade or severity of the findings.
5. Provide an objective assessment for the oncologist so that they may decide if the next dose of the ADC can be given as scheduled, delayed, reduced, or discontinued.

By fostering interdisciplinary collaboration, coordination of care between oncology and eye care providers can ensure that ADC therapy continues to deliver life-saving benefits while preserving patients' vision and quality of life

AAO. Antibody-Drug Conjugates and Ocular Toxicities: A Call for Standardized Guidelines. Updated July 2025. https://www.aao.org/education/clinical-statement/antibody-drug-conjugates-ocular-toxicities-call-st. Accessed February 10, 2026.

Strategies For Prevention and Management of Ocular AEs*

Recommendations	Belantamab mafodotin	Mirvetuximab soravtansine	Tisotumab vedotin
Prophylaxis			
Preservative-free artificial tears or lubricating eye drops	✓	✓	✓
Ophthalmic topical corticosteroids before and during treatment		✓	✓
Vasoconstrictor eye drops immediately before each infusion			✓
Use cooling eye pads during infusion			✓
Avoid contact lenses unless directed by an eye care provider	✓	✓	✓
Monitoring			
Ophthalmic examination (visual acuity and slit lamp) prior to initiation	✓	✓	✓
Regular ophthalmic examinations (visual acuity and slit lamp)	✓	✓	✓
Advise patients to report any visual changes	✓	✓	✓
Management			
Ophthalmic examination (visual acuity and slit lamp) promptly for worsening symptoms	✓	✓	✓
For moderate or severe ocular AEs, withhold treatment until improvement, then restart at same or reduced dose, or consider permanent discontinuation for worsening symptoms that are unresponsive	✓	✓	✓
Consider ophthalmic topical corticosteroids if indicated after ophthalmic examination	✓		

**this table includes some of the commonly used ADCs but is not a comprehensive list of FDA-approved ADCs*

Adapted from Dy GD, Farooq AV, Kang JJ. Ocular adverse events associated with antibody-drug conjugates for cancer: evidence and management strategies The Oncologist. 2024;29,:e1435-e1451.

Patient Education

Here to manage eye care

Use this resource to help care for your eyes while on treatment

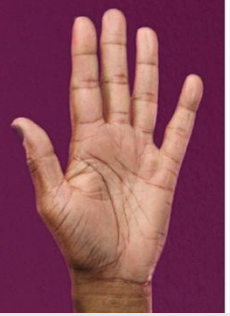
What is MIRV

MIRV is a prescription medicine used to treat adults with folate receptor-alpha positive ovarian cancer, fallopian tube cancer, or primary peritoneal cancer who:

- have not responded to or are no longer responding to treatment with platinum-based chemotherapy **and**
- have received 1 to 3 prior types of chemotherapy.

Your healthcare provider will perform a test to make sure that MIRV is right for you.

It is not known if MIRV is safe and effective in children.



RECOMMENDED EYE DROP SCHEDULE

Steroid eye drops

Using steroid eye drops is recommended throughout your infusion cycle.

Steroid Eye Drop Schedule for Each Infusion Cycle (Every 3 Weeks)

Lubricating eye drops

The use of preservative-free lubricating eye drops is also recommended at least 4 times daily and as needed during treatment. **Wait at least 10 minutes after applying steroid eye drops** before using lubricating eye drops

REMINDERS

- You should use eye drops as directed by your doctor
- Avoid wearing contact lenses throughout your treatment unless your doctor tells you that you can
- During treatment, tell your doctor if you experience any eye problems, including blurred vision, dry eyes, sensitivity to light, eye pain, or new or worsening vision changes
- 2 MONTHS — A 2-month supply of lubricating eye drops is enclosed in the treatment starter and welcome kits

CARING FOR YOUR EYES IS AN IMPORTANT PART OF YOUR TREATMENT. THIS BOOKLET WILL HELP YOU KEEP TRACK OF WHEN YOU'LL NEED TO USE EYE DROPS AND WILL HELP REMIND YOU TO TAKE THEM AS DIRECTED.

TYPES OF EYE DROPS

Before receiving treatment, and periodically throughout your treatment, your doctor will have you meet with an eye doctor (ophthalmologist or optometrist).

You will receive 2 kinds of eye drops for use before and during your treatment:

- Prescription steroid eye drops, filled by a pharmacist
- Over-the-counter, lubricating, preservative-free eye drops

Caring for your eyes may reduce your risk of eye problems

Eye problems are common with TV and can be severe. TV can cause changes to the surface of your eye that can lead to dry eyes, eye redness, eye irritation, corneal ulcers, blurred vision, and severe vision loss.

TV Required Eye Car
eye problems. Talk to yo
routine while on TV.

Start your eye drop regimen

Either your oncologist or eye specialist will prescribe 3 different types of eye drops. These eye drops may help reduce the risk of eye problems.

What	Why	When
Steroid drops (requires a prescription)	May help protect against redness, swelling, and itchiness	- About 10 minutes before your infusion - For 3 days after the infusion
Vasoconstrictor drops (requires a prescription)	May help keep Tivdak from affecting your eyes by reducing blood flow in the eyes	- Right before your infusion
Lubricating drops (purchase over the counter)	May help reduce and relieve dryness and discomfort	- Duration of treatment and for 30 days after your last dose of Tivdak

BRING ALL 3 EYE DROPS TO EACH INFUSION APPOINTMENT

Pfizer. Caring for Your Eyes. Updated https://www.tivdak.com/starting-tivdak/. Accessed March 10, 2026.
AbbVie. Here to manage eye care. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/. Accessed March 10, 2026.
AbbVie. Eye Drop Tracker. https://www.elahere.com/pdf/eye-drop-tracker.pdf. Accessed March 10, 2026.

Take-Home Points

Q & A

Marc Bloomenstein, OD, FAAO

Key Learning Points

- Assessing corneal sensitivity is critical for maintaining ocular surface viability
- New formulations of immunomodulating anti-inflammatory drops have proven to improve efficacy and adherence to dry eye treatment
- Utilizing in-office treatment will improve adherence and with insurance coverage more patients will be treated
- *Demodex* and MGD share similar symptoms and when faced with both treating *Demodex* can help manage MGD
- Preservatives do not improve the ocular surface; when given an option, choose preservative free
- Follow the prevention, monitoring and management strategies for patients on ADCs and communicate with the oncologist to maintain the best care for patients

Thank You for Attending!

FUNDINGSLAND GROUP

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